

REQUEST FOR RECONSIDERATION

Upon entry of applicants' amendment, claims 1-6 and 8-13 and 19-20 will now be active in this application.

The claimed invention is directed to a process for the preparation of dendritic or hyperbranched polyurethanes, dendritic or hyperbranched polyurethanes and methods for producing reaction products of dendritic or hyperbranched polyurethanes.

Dendritic or hyperbranched polyurethanes have found industrial applicability but have suffered from costly and complex preparation techniques. Simpler and less costly techniques are sought.

The claimed invention addresses this problem by providing a method for preparing dendritic or hyperbranched polyurethanes by reacting diols or polyols having **1) at least one tertiary nitrogen atom; and 2) at least two hydroxyl groups, having differing reactivity toward isocyanate groups, with diisocyanates or polyisocyanates**. Applicants have discovered that reaction of diols or polyols having **at least one tertiary nitrogen atom and at least two hydroxyl groups, having differing reactivity** toward isocyanate groups to provide a simple method for the preparation of dendritic or hyperbranched polyurethanes. Such a process and dendritic or hyperbranched polyurethane are nowhere disclosed or suggested in the cited reference of record.

The rejection of claims 1-6 and 8-20 under 35 U.S.C. §103(a) over Perez et al U.S. 4,786,682 in view of Bruchmann et al U.S. 6,376,637 is respectfully traversed.

None of the cited references disclose or suggest a diol or polyol having **at least one tertiary nitrogen atom and at least two hydroxyl groups of differing reactivity** towards isocyanate groups being reacted in two steps to prepare a dendritic or hyperbranched polyurethane.

Perez et al. merely describes a Michael addition product formed by reacting one or more primary and/or secondary amino groups and additionally contains one or more hydroxyl groups with a material containing at least two α,β -ethylenically unsaturated moieties wherein **the addition product** contains hydroxyl functionality (column 2, lines 11-23). The hydroxyl groups in the Michael adduct are capable of reacting with a curing agent in the formation of a coating composition, forming a crosslinked film (column 6, lines 3-8).

However, there is no specific disclosure of the Michael adduct having a tertiary nitrogen and at least two hydroxyl groups of differing reactivity. Specifically, the Michael adduct of a preferred dialkanolamine (column 2, lines 25-32) with a compound with at least two α,β -ethylenically unsaturated moieties would provide a Michael adduct with a single hydroxyl group which would have a single reactivity.

Hydrocarbon polyol polyacrylates are described beginning on column 3, line 18, wherein a polyhydric material is reacted with acrylic acid, the polyol polyacrylate may or may not have residual hydroxyl groups and the polyol may have hydroxyl groups of the same or of differing activity (column 3, lines 34-51). Thus, since the starting polyol may have hydroxyl groups of the same reactivity (e.g. 1,3-propane diol having two primary alcohol groups) if a polyol polyacrylate were formed to have a single residual primary hydroxyl residue and if diethanolamine were used to form the Michael adduct, the product would have two primary hydroxyl group, which would have **substantially the same reactivity**.

Thus, it is not the case that Perez et al. would necessarily suggest formation of a Michael adduct having a tertiary nitrogen **and** at least two hydroxyl groups of differing activity.

Further, while page 3 of the official action speculates as to the formation of a Michael adduct from diethanolamine or diisopropylamine with 2-hydroxyethyl acrylate or 2-hydroxypropyl acrylate, as having at least two hydroxyl groups of differing reactivity, such a

Michael adduct is **not suggested** by Perez et al. since the Michael adduct is formed with a material containing **at least two α,β -ethylenically unsaturated moieties** (column 2, lines 53-55). 2-hydroxyethyl acrylate and 2-hydroxypropyl acrylate each only have one unsaturated moiety.

Furthermore, while a polyisocyanate curing agent is described, there is no suggestion to react the Michael adduct in a process in which the higher reactivity hydroxyl groups are reacted predominantly in the first step and the lower reactivity hydroxyl groups are reacted in the second step.

Quite simply, there is no disclosure or suggestion of forming a dendritic or hyperbranched polyurethane. In fact, by using a blocked or capped polyisocyanate, a one package stable coating composition may be obtained (column 6, lines 27-32). Alternatively, if the polyisocyanate is not blocked, a two package coating composition may be obtained. Thus, the reaction of polyisocyanate curing agent with the Michael adduct is in **a single step**, to form a crosslinked coating composition. Such a single step reaction fails to suggest forming a dendritic or hyperbranched polyurethane.

In contrast, the claimed invention is directed to **a process** for preparing a dendritic or hyperbranched polyurethane by reacting a diol or polyol having at least one tertiary nitrogen and at least two hydroxyl groups of differing reactivity, in which higher reactivity hydroxyl groups are predominantly reacted with isocyanate groups in a first step and lower reactivity hydroxyl groups are reacted with isocyanate groups in a second step. Since Perez et al. only describes **a single reaction step** with a polyisocyanate, the claimed process in which hydroxyl groups are reacted in first and second steps, would not have been rendered obvious by this reference.

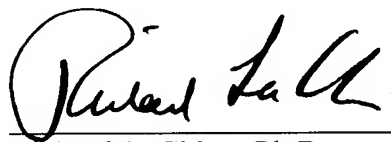
While Bruchmann has been cited for a process of preparing dendritic and highly branched polyurethanes, such is not a disclosure of reacting a compound having a tertiary nitrogen atom and at least two hydroxyl groups of differing activity.

In view of the deficiencies of the disclosure of the cited art, the claimed invention would not have been obvious and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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